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THESIS

AN EVALUATION OF MEXICO'S DECLINING OIL PRODUCTION AND WANING PETROLEUM RESERVES

by

Erik Rangel

March 2011

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Since nationalizing its oil industry in 1938, Mexico has maintained high levels of fiscal dependency on oil revenues. However, oil production in Mexico is quickly declining. In fact, oil production levels in 2010 were at their lowest levels in 20 years. *Petróleos Mexicanos* (Pemex), Mexico's state-owned oil monopoly and cash cow, currently provides the Mexican government with approximately 40% of its total revenues. Mexican oil revenues have long been exploited and mismanaged by successive administrations rather than invested in exploration projects, infrastructure modernization, or process efficiency improvement. Decades of severe financial constraints placed on Pemex by the Mexican government, coupled with a weak corporate culture, have left Pemex unable to deal effectively with the oil production crisis at hand. This thesis examines the factors that explain why Mexican oil production has dwindled, despite the government's tremendous economic and political incentives to preserve revenues generated by oil rents.

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AN EVALUATION OF MEXICO'S DECLINING OIL PRODUCTION AND WANING PETROLEUM RESERVES

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ABSTRACT

Since nationalizing its oil industry in 1938, Mexico has maintained high levels of fiscal dependency on oil revenues. However, oil production in Mexico is quickly declining. In fact, oil production levels in 2010 were at their lowest levels in 20 years. *Petróleos Mexicanos* (Pemex), Mexico's state-owned oil monopoly and cash cow, currently provides the Mexican government with approximately 40% of its total revenues. Mexican oil revenues have long been exploited and mismanaged by successive administrations rather than invested in exploration projects, infrastructure modernization, or process efficiency improvement. Decades of severe financial constraints placed on Pemex by the Mexican government, coupled with a weak corporate culture, have left Pemex unable to deal effectively with the oil production crisis at hand. This thesis examines the factors that explain why Mexican oil production has dwindled, despite the government's tremendous economic and political incentives to preserve revenues generated by oil rents.

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LIST OF ACRONYMS AND ABBREVIATIONS

CIA	Central Intelligence Agency
CMIC	Cámara Mexicana de la Industria de la Construcción
DoD	Department of Defense
EEZ	Exclusive Economic Zone
GDP	Gross Domestic Product
IMP	Instituto Mexicano del Petróleo
ITAM	Instituto Tecnológico Autónomo de México
KMZ	Ku Maloob Zaap
NAFTA	North American Free Trade Agreement
NOC	Nationally Owned Company
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of the Petroleum Exporting Countries
PAN	Partido Acción Nacional
PDVSA	Petróleos de Venezuela S.A.
Pemex	Petróleos Mexicanos
PEP	Pemex Exploración y Producción
Petrobras	Petróleo Brasileiro S.A.
PRD	Partido de la Revolución Democrática
PRI	Partido Revolucionario Institucional
SEMIP	Secretaría de Energía, Minas e Industria Paraestatal
SENER	Secretaría de Energía de México
STPRM	Sindicato de Trabajadores Petroleros de la República Mexicana
U.S.	United States
USGS	United States Geological Survey

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To my loving and beautiful wife, Jennifer. Our time here in Monterey and Carmel will always mark a very special moment for us, as this is where we wed and began our lives together. I thank you for the unconditional love and support you have shown me while completing this degree and for the occasional kick in the pants. I love you, and so our journey together begins.

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I. INTRODUCTION

A. OVERVIEW

Mexico's oil production is quickly deteriorating. In fact, Mexico's oil production in 2010 was at its lowest level in 20 years.[1] Mexico's state-owned oil monopoly, *Petróleos Mexicanos* (Pemex), which provides the Mexican government with approximately 40%[2] of its total fiscal income, has long been the government's cash cow, milked of its revenues by successive administrations rather than reinvesting its profits into future exploration projects, modernizing infrastructure, or improving process efficiency.[3] Pemex's inefficiency, not entirely uncharacteristic of a state-owned monopoly, coupled with a weak corporate culture and debilitating bureaucracy, have left it unable to deal effectively with the crisis at hand. This predicament, of course, is not exclusively a Mexican problem as "few oil-rich countries have the fiscal discipline to invest the windfalls prudently, most squander then on wasteful projects."[4] While the Mexican government has vowed to invest US$60B into Pemex by 2012 to boost production and has almost doubled its exploration budget from US$30B in 2005 to US$50B in 2008, efforts have thus far been fruitless as production levels continue to decline at an accelerated rate. Thus, despite having tremendous economic and political incentives to preserve revenues generated by oil rents, what factors explain Mexico's declining oil production?

In his final and unfinished book, *El Són del Corazón*, published 11 years after his death in 1921, Mexican poet Ramón López Velarde wrote, "*Oh Homeland, the child*

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[1] Lourdes Melgar, "Impact of the Deep Horizon Oil Spill on Mexico's E&P" (presented at the Center for Strategic and International Studies (CSIS) Energy and National Security Program, Institute of the Americas, Washington D.C., August 5, 2010).

[2] Jeremy Martin and Pierre Merzeau, "Taking Stock of Oil and Pemex and Implications of the Gulf Spill," *Oil, Gas & Energy Law Intelligence* 8, no. 3 (2010): 2.

[3] George W. Grayson, *The Politics of Mexican Oil* (Pittsburgh: University of Pittsburgh Press, 1980), 100.

[4] Michael L. Ross, "Blood Barrels: Why Oil Wealth Fuels Conflict," *Foreign Affairs* 87, no. 3 (2008): 2.

Jesus left you a stable/and the Devil left you springs of petroleum."(23–24).[5] While Lopez, of course, could not have foreseen the tumultuous dependency on oil rents that his future countrymen were to endure, his remarks are no less censoriously ominous. Given Mexico's heavy dependency on oil revenues for public spending and institutional development, it comes as no surprising consequence that scholars, such as Terry Lynn Karl, argue that Mexico has been transformed it into a petro-state.[6] They contend that the intertwined political and corporate association between the Mexican state and Pemex has created an interdependent culture of monopolistic inefficiency and political mismanagement. Luis de la Calle, a Mexican economist and professor at the Instituto Tecnológico Autónomo de México (ITAM), has gone so far as to describe Mexico's petrol-based economy as, "like Russia: all oil and corruption."[7] This thesis examines and evaluates whether Mexico is a petro-state in the present-day and expound on the myriad of reasons why Mexican oil production has dwindled despite the government's high level of fiscal reliance on oil rents, in lieu of taxation.

B. IMPORTANCE

Since the early years of World War II, the United States (U.S.) has come to rely heavily on Mexican oil supplies. In fact, initiated by the *Bracero* program in 1942, Mexico became the primary supplier of oil to the United States during the war, even allowing U.S. Navy officers to take command of its oil tankers after two of them, the *Potrero del Llano* and the *Faja de Oro*, were sunk by German U-boats while transporting oil to refineries in the United States.[8] Despite prior objections to nationalize Mexico's oil industry in the 1930s, the United States soon realized that it was in its own best interest to encourage a stable and amicable relationship with Mexico. The strategic importance of this relationship amongst neighbors became increasingly obvious as the United States

[5] Ramón López Velarde, *Song of the Heart: Selected Poems* (Austin: University of Texas Press, 1995), 28.

[6] Terry Lynn Karl, *The Paradox of Plenty* (Berkeley: University of California Press, 1997), 19.

[7] "Getting Bigger," *The Economist*, October 2, 2010, Americas section, 42.

[8] Robert L. Scheina, *Latin America's Wars Vol. II: The Age of the Professional Soldier, 1900–2001* (Washington, D.C.: Brassey's, 2003), 170.

entered further into the war.[9] Growing national security concerns, coupled with the need to secure a reliable source of petroleum, quickly overshadowed even the most vociferous U.S. oil companies and investors, and in 1942, both countries entered into a formal alliance against the Axis powers.[10] Since then, Mexico has remained a principal source of petroleum and is currently the second largest exporter of crude oil to the United States.[11] As a result of this close trade relationship, along with U.S. hegemonic influence, Mexico has consistently aligned its trade policies with U.S. interests, even opting not to join the Organization of the Petroleum Exporting Countries (OPEC), even though membership would have emphasized Mexican independence from the United States in international relations.[12] Consequently, Mexico and the United States have enjoyed a mutually beneficial relationship where the latter has come to view Mexican crude oil imports as a prudent, more amicable alternative to imports from an OPEC member, oil-producing country. Conversely, Mexico has come to rely heavily on its proximity to the United States as one of its greatest economic assets and competitive advantages, not to mention the Mexican state's dependence on tax revenues generated by Pemex.[13] In short, and while mutually beneficial in many aspects, this familiar and long-standing relationship between the United States and Mexico has also served to fuel Mexico's fiscal dependency on oil revenues and fed the U.S.'s insatiable addiction to oil.

While Mexico's petroleum industry and interdependent development have been well documented by numerous scholars and publications, its decreasing oil production is a rather new phenomenon and has yet only been analyzed by a small number of journals and periodicals. This thesis researches, analyzes, and concludes by identifying the

[9] Lorenzo Meyer, *The United States and Mexico* (Chicago: University of Chicago Press, 1985), 155.

[10] Meyer, *The United States and Mexico*, 155.

[11] U.S. Energy Information Administration, Crude Oil and Petroleum Imports Top 15 Countries, 2010 Import Highlights, February 25, 2011.

[12] Grayson, *The Politics of Mexican Oil*, 144–145.

[13] Riordan Roett and Guadalupe Paz, *China's Expansion into the Western Hemisphere* (Washington D.C.: Brookings Institute Press, 2008), 2, 18.

contributing factors that have led to Mexico's inability to tap new oilfields effectively and meet production expectations, despite having abundant resources in the Gulf of Mexico and considerable state reliance on oil-generated revenues.

C. PROBLEMS AND HYPOTHESES

Two hypotheses can be formulated by analyzing the literature written thus far vis-à-vis the oil production crisis in Mexico. The first hypothesis employs an institutional approach and posits that Mexico's inability to deal effectively with its waning oil production is the result of decades of inefficiency and mismanagement, and has thus, conferred upon Mexico the status of a rentier state. This hypothesis contends that existing rentier networks in Mexico have shaped the behavior and strategies of both state institutions, as well as private parties, consequently throwing the country into a vicious cycle where development is dogmatically contingent upon petrodollars.[14] Additionally, and consistent with other rentier states, Mexico is blatantly negligent in collecting taxes from its citizens as there was no need to develop the state tax collection apparatus while rents from oil production remained high; thus, exacerbating the fiscal dependency on petrodollars.[15] This hypothesis further argues that even as the Mexican state attempts to reform state policies by constructing and implementing a more coherent bureaucracy, these efforts will be largely inadequate at combating the oil crisis "because powerful oligopolistic interests will find myriad ways to block the formation of a state apparatus that cannot be successfully penetrated by them."[16]

The second hypothesis applies a structural and technological approach. This hypothesis explores the contention that oil is a finite and depletable resource. This hypothesis examines Hubbert's "peak oil" theory, which asserts that oil production predictably follows a bell-shaped curve. Peak oil contends that Mexico's waning oil production levels are simply indicative of petroleum reserves that have peaked and are now on a declining slope (see Figure 1). It should be noted that the term "peak oil" does

[14] Karl, *The Paradox of Plenty*, 73.

[15] Michael Reid, *Forgotten Continent: The Battle for Latin America's Soul* (New Haven: Yale University Press, 2007), 181.

[16] Karl, *The Paradox of Plenty*, 240.

not imply that the world, or in this analysis of Mexico, is running out of oil; instead it insists that an inevitable point in oil production exists at which output can no longer increase, and production begins to decline.[17] This thesis presents data contrary to Hubbert's peak oil theory, namely by Leonardo Maugeri and Robin Mills, in order to illustrate that Mexico's waning production is, in fact, not consistent with peak oil theory. This hypothesis employs a technological approach to answer the question of why Pemex is the only operator in the region (Gulf of Mexico) to be experiencing declining production while transnational corporations such as Chevron and Royal Dutch Shell continue to operate lucrative oil wells in the Gulf of Mexico, just beyond Mexico's exclusive economic zone (EEZ). The evaluation of this hypothesis will include a technical assessment of Pemex' technological expertise in order to explain why Pemex has been unable to locate and exploit new oilfields in the Gulf of Mexico.

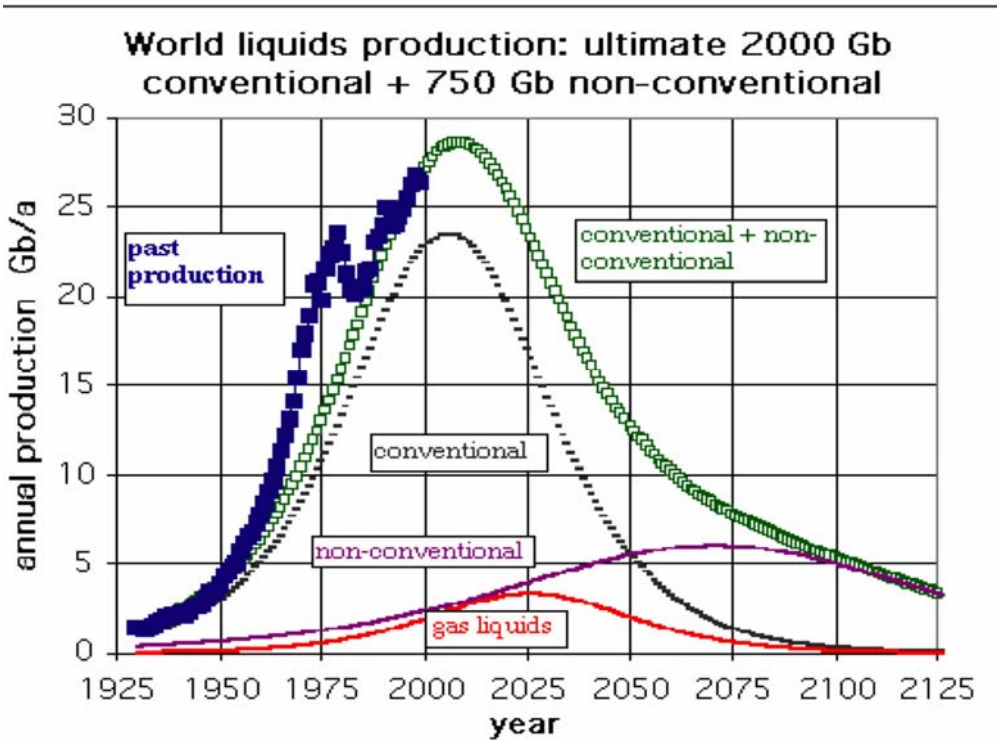

Figure 1. Hubbert's Peak Theory of World Oil Production[18]

[17] Laurel Graefe, "The Policy Implications of Peak Oil," in *Handbook of Oil Politics*, ed. Robert E. Looney, Chapter 5 (London: Routledge, forthcoming), 1.

[18] U.S. Department of Energy, *Strategic Significance of America's Oil Shale Resource (March 2004)* (Washington, D.C.: Office of Naval Petroleum and Oil Shale Reserves, 2004), 2.

D. LITERATURE REVIEW

While a great deal of academic literature analyzes and discusses Mexico's petro-state dependent development, little academic literature exists that directly addresses the topic of their decreasing productivity, waning reserves, or identifies causality. It is important to note that Mexico does, however, stand as a bit of an outlier from other petro-states, namely OPEC members, in that its oil boom was not the result of oil price hikes, but rather of lucrative, and in some cases accidental, oil discoveries.[19] In fact, the Cantarell oilfield was not discovered until 1976 and not put into production until 1981.[20] Cantarell was Mexico's largest producer and most abundant source of crude oil from 1981 until its sudden and unexpected decline in 2005; its significance will be discussed in much greater detail in ensuing chapters. Still, however, Mexico suffers from the same self-inflicted and exorbitant ratio of debt service to exports and political and economic instability as other "capital-deficient" oil exporters, or petro-states.[21]

Author George Grayson has discussed and documented, in noteworthy detail, the strong correlation between Mexican politics, specifically the *Partido Revolucionario Institucional* (PRI), the oil industry and the often-indistinguishable line between political prerogatives and oil-generated revenues. His research provides meticulous background information and history regarding the creation of Pemex, its corporate and political structure, as well as Mexico's friendly, yet often strained, relations with the United States. It should be noted that Grayson's research is a bit dated, as it was conducted prior to Mexico's debilitating debt crisis, during the 1980s, and the resulting economic policy changes. Still, Grayson should be credited for having addressed and foreseen many of the relevant dilemmas facing Mexico's petroleum industry today, namely the nominal and insufficient resources allocated for future exploratory activity.[22] While some scholars and experts in the field, such as Mario Ramón Beteta, economist and former director general

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[19] Karl, *The Paradox of Plenty*, 18–19.

[20] "The End of Cantarell," *Latin American Regional Report—Mexico and NAFTA*, RM-09-10 (October 2009): 10–11.

[21] Karl, *The Paradox of Plenty*, 32.

[22] Grayson, *The Politics of Mexican Oil*, 44.

of Pemex, and Pamela Falk maintain that no direct correlation exists between the resources used for exploration and the results obtained from such efforts.[23] Grayson expertly counters this point by highlighting that much of Mexico's production dilemma is, in fact, the result of imprecise and unguided exploratory drilling, or what he refers to as "wildcat drilling."[24] It will be argued in Chapter III of this thesis that the practice of undisciplined "wildcat drilling" continues to plague Pemex' exploratory operations to date.

Studies submitted by Velasco and Grayson have tackled the issues of corporate and political corruption within Mexico vis-à-vis its management of Pemex, as well as closely examining the corporate culture and political reach of Pemex executives and oil workers union leaders. Velasco goes so far as to deduce that there exists a deep-seated interdependency between the oil revenues generated by Pemex and Mexico's economic and political development, which he concludes, endangers Mexico's continuing political stability.[25] He continues to add that Mexico has yet to decrease its reliance on Pemex and vice versa, and that Pemex operates with a limited degree of autonomy regarding its internal decision-making policies and long-term strategies.[26]

The most recent and definitive academic literature concerning the depletion of hydrocarbons is Robin M. Mills,' *The Myth of the Oil Crisis: Overcoming the Challenges of Depletion, Geopolitics, and Global Warming*, published in 2008. In it, the author contends, using sophisticatedly noteworthy quantitative measures and analysis, that, in fact, no such oil depletion crisis exists and effectively debunks Hubbert's peak oil theory, which, as previously stated, argues that the rate of petroleum production tends to follow a bell-shaped curve. Mills further asserts that green energy alternatives could displace the world's reliance on fossil fuels. The author also contends that Mexico lacks the funding, incentive, and above all, the technological expertise to perform successful exploration

[23] Mario Ramón Beteta. "The Role of the Oil Industry in Mexico," in *Petroleum and Mexico's Future* ed. Pamela S. Falk (Boulder: Westview Press, 1987), 70.

[24] Grayson, *The Politics of Mexican Oil*, 40.

[25] Jesús Agustín Velasco-S., *Impacts of Mexican Oil Policy on Economic and Political Development* (Toronto: Lexington Books, 1982), 202.

[26] Ibid., 20–21.

economically.[27] However, the author of this thesis argues that Mills' conclusion, while fastidiously supported with empirical and quantitative data, would be increasingly useful if it addressed, at least partially, the negative economic and developmental implications associated with diminishing oil revenues within a petro-state, as well as the political and societal withdrawals from the evaporation of oil rents. Furthermore, Mills does not offer recommendations as to how a state is to reform its economic policies and recover lost revenues to combat the detrimental economic, political, and societal byproducts effectively that have been brought on by dwindling oil production and the loss of their associated state revenues. Lastly, it is important to indicate that this thesis has employed these sources to provide a historical context of the Mexican oil industry to analyze structural and institutional patterns, as well as to highlight the often-indistinguishable line between political prerogatives and oil-generated revenues. Hubbert's peak oil theory and contradictory theories will be addressed and evaluated in greater detail in Chapter III of this thesis.

E. METHODS AND SOURCES

This thesis examines the creation and management of Pemex, as well as Mexico's historical trajectory as a petro-state by employing a process tracing methodology. It begins with a historical and institutional analysis of Mexico's oil industry, then identifies and evaluates structural and technological factors and shortcomings. Lastly, it addresses the current strategies of the *Instituto Mexicano del Petróleo* (IMP) and Pemex for contending with declining oil production, as well as the diminishing prospects for future exploration and the discovery of additional Mexican oilfields. This thesis will perform an across time analysis of the development of Pemex, focusing almost exclusively on the period from the 1970s through the present. It further includes an analysis of structural factors, considering the location of currently active oilfields. This thesis examines the technological argument that Pemex categorically lacks the technological expertise to tap successfully deepwater reserves located along the Mexico's exclusive economic zone along the Gulf of Mexico and evaluates Pemex' progress with their newly acquired sixth

[27] Robin M. Mills, *The Myth of the Oil Crisis: Overcoming the Challenges of Depletion, Geopolitics, and Global Warming* (Westport: Praeger Publishers, 2008), 65.

generation deepwater oilrig, *Centenario*, for geophysical exploration. Additionally, it examines Mexico's highly criticized and tepid energy sector reform, which would allow for limited contractual partnerships with foreign firms for the development of deepwater oilfields.[28]

F. THESIS OVERVIEW

Chapter II examines the historical and political institutional background regarding the creation of Pemex, referencing the nationalization of Mexico's petroleum industry by President Lázaro Cárdenas in 1938, to include a brief analysis of the prerogatives conferred on the state by the Constitution of 1917. It should be noted that this section of the chapter, 1930s through 1960s, solely serves in a prefatory function. The thesis analytical focus is on the Mexico/Pemex association since the 1970s, namely since the discovery of the world's second-largest producing oil field (Cantarell) in 1976 through the present day oil production crisis in Mexico. Chapter II is divided into four subsections, each corresponding to and focusing on oil sector and associated policy during a six-year presidential term, or *sexenio*, from 1976 through 2000. Chapter II is organized by subsections in order to more clearly present and focus on examining the historical context that led to Mexico's development as a petro-state up to the 1980s, as its dependency on oil revenues for economic and political development were prevalent during this period. Additionally, Chapter II examines the structural aspects of Mexico's oil industry, namely the locations of large oil fields and the fact that most oil fields in use today are easily accessible with minimal drilling. This chapter explores the intertwined political and corporate cultures of the Mexican government and Pemex to derive and highlight the interdependent culture of monopolistic inefficiency, political mismanagement, and economic exploitation during this period. The last subsection of Chapter II briefly discusses the introduction of the *nuevo peso* in 1993 and its ensuing devaluation, referred to as the "December Mistake" (see Figure 2), due to a shift in Mexican monetary policy from a fixed exchange rate to a floating exchange rate. This devaluation serves to highlight further the relationship between oil rents and politics in

[28] "Production Problems," *Latin American Regional Report—Mexico and NAFTA*, RM-09-02 (February 2009): 8.

Mexico. Additionally, this subsection discusses the 1994 and 2000 presidential elections, which marked a transition of regimes and effectively ended the reign of single party politics in Mexico. It addresses why democratization and a political party shift has failed to improve efficiency within Pemex, has not increased the government's ability or willingness to levy or collect individual income taxes, nor reduced the government's dependency on oil generated revenues for public spending. The intent of this chapter is to focus on identifying patterns of institutional and developmental shortcomings in Mexico with regard to its oil industry, and their causes. Chapter II concludes by assessing the institutional impact that the "accidental" discovery of the Cantarell oil field in 1976, the second-largest producing oil complex in the world until 2006, has had on Mexico and Pemex, as well as evaluating the consequences of "easy oil" and the resulting booming oil rents.[29]

Chapter III analyzes whether dwindling production levels are due to the naturally occurring depletion of a finite resource, per Hubbert's peak oil theory, or if they are the result of inadequate drilling infrastructure and technological prowess on the part of Pemex. It assesses the current state of "Mexico's piggybank,"[30] Pemex, and waning production levels by considering Mexico's current and future drilling prospects as compared to other nationally owned petroleum companies operating in the region. Chapter III evaluates whether Mexico can still be considered a petro-state, as some authors have contended, by examining the reliance on oil revenues by the Mexican state over time, and proportionate to their Gross Domestic Product (GDP). Additionally, it addresses Mexico's growing security concerns and the implications associated with its weakening economy, while identifying correlations between state deficiencies and lost oil revenues. Lastly, it evaluates Mexico's recent, 2008, attempts to reform their energy sector and explains why they have been largely unable to pass legislation allowing for the reformation of the oil sector and how a political stalemate has ultimately dashed any prospect of passing any meaningful reform during Calderón's *sexenio*.

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[29] Karl, *The Paradox of Plenty*, 18–19.

[30] Manuel Pérez-Rocha, "The Future of Mexico's Oil," *Global Exchange*, June 17, 2008, http://www.globalexchange.org/countries/americas/mexico/5762.html.

This thesis concludes in Chapter IV with a summary of significant findings and analysis of relevant facts and theories presented in the previous chapters regarding Mexico's petroleum industry. The concluding chapter utilizes elements of institutional, structural, and technological theories to deduce the explanation, and moreover, the relevance, of Pemex's declining oil production levels and the subsequent loss of associated oil generated government revenues.

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II. MEXICO: THE PRI YEARS—A TALE OF CLIENTELISM AND CORPORATISM

A. INTRODUCTION

Chapter II serves to provide a historical context with regard to the creation of Pemex in 1938 through Mexico's democratization period of the 1990s. This chapter the developmental and institutional variances between authoritarian and democratic rentier states, and why these variances matter in the case of Mexico. More specifically, it contrasts the institutional tendencies within a single party system, as was the case in Mexico during this time period, against those of fully democratic regimes. Additionally, it addresses the clientelistic and corporatist structures vis-à-vis the state and oil revenues during this period, to include large-scale corporate and political corruption, under the reign of the *Partido Revolucionario Institucional* (PRI). This chapter historically examines Mexico's institutional development vis-à-vis Pemex, as well as the structural factors that have influenced Mexico's oil policy. This thesis argues that factors have, in fact, retarded Mexico's ability to deal effectively with the crisis of lost oil production. Chapter II is further divided into four subsections, each corresponding to a six-year presidential term, *sexenio*, from 1976 through 2000. These subsections address the aforementioned corporatist structure of the Mexican state and Pemex during respective presidential terms. It concludes with a brief synopsis of its principal aim of providing a historical context in order to more clearly examine this thesis' hypotheses and proceed to evaluating contemporary conditions addressed in the ensuing chapter.

B. THE BIRTH OF PEMEX

No dialogue vis-à-vis the Mexican oil industry would be complete without first historically prefacing the nationalization of Mexico's oil industry and the subsequent creation of Pemex. In a national radio address on March 18, 1938, Mexican President Lázaro Cárdenas, incapacitated by national oil strikes and increasing hostilities between Mexican workers and U.S., British, and Dutch oil companies, publically decreed that "*¡El petróleo es nuestro!*—The oil is ours!" Cárdenas immediately expropriated all

foreign oil firm assets and terminated all foreign drilling and exploration in Mexico, altogether forcing out foreign oil interest and investment from Mexico.[31] Employing the prerogatives conferred on the state by Article 27 of the Mexican Constitution of 1917 and his incontestable presidential power, Cárdenas formed Pemex as a nationally owned, nationally run industry. Shortly after expropriation, Cárdenas offered to compensate the affected parties for lost machinery and infrastructure. Once an agreed upon value could be determined, submission of payment was to be made within a 10-year period and preferably paid for in oil. Every affected U.S. corporation with the exception of the Sinclair Oil Company, which agreed to an US$8.5M indemnification, indignantly refused such offers, proclaiming it nothing more than "payment in their oil" and continued to petition the U.S. State Department to exert diplomatic and economic pressure on Mexico.[32] Despite this considerable pressure from Washington and foreign oil firms, that all but demanded the resumption of private capital investment and direction within Pemex, Mexican authorities decided that their oil industry would remain part of the public sector to be run as a state monopoly.[33] "This expropriation measure had become the touchstone of economic independence for Mexico: from then on, it became increasingly difficult for foreign enterprises to return to Mexico except in a subordinate role."[34] It is worth noting, however, that in April 1942, after the United States had formally entered into WWII, the U.S. State Department successfully negotiated for the fair compensation of expropriated materials from U.S. oil firms with Mexico's newly elected president, Manuel Avila Camacho, for the agreed upon amount of US$29M.[35]

[31] Jeremy Martin, "Oil in Mexico and United States Energy Security: A Tale of Symbiosis," *Journal of Energy Security* (ENSEC) (January 2010): 1.

[32] Meyer, *The United States and Mexico*, 151.

[33] George Phillips, "The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex," *Bulletin for Latin American Research* 18, no. 1 (1999): 38.

[34] Meyer, *The United States and Mexico*, 150.

[35] Ibid., 156.

Since expropriation, March 18 has become a celebrated federal holiday and Cárdenas a national hero, concretely illustrating the symbiotic relationship between Mexico and its oil industry; further cementing the embodiment of Pemex as a pillar of Mexican nationalism. "In Mexico oil is not merely a chemical compound but rather a fundamental element of sovereignty. Simply put, oil is part of the national DNA."[36]

C. PEMEX' INSTITUTIONAL DEVELOPMENT UNDER SINGLE PARTY AUTHORITARIANISM: 1938–1976

Institutions inherently develop and behave differently under authoritarianism than they do under democracy.[37] The protection of property and independent legal rights are more likely to be established within a competitive political system. Since all political actors within a democratic system realize that their respective parties will not have control of the executive or be running government permanently, they will look to protect themselves by institutionalizing the rule of law for periods when the opposition is in control.[38] Furthermore, and specific to the energy sector, actors within a democratic political system will seek to institutionalize effective energy policies that promote competition in exploration and production in order to maximize process efficiency and oil revenues. In doing so, political actors will be in a better position to satisfy their constituencies by erecting and financing public goods with oil rents.[39] Additionally, the political imperative to recompense constituents with public goods procured with oil rents within an openly competitive political arena makes it less likely that political leaders will attempt to make a grab for maximum short-term oil rents as a competitive system incentivizes long-term authority. Also, "an independent and effective regulator is more likely to be established if the political system is competitive."[40] The creation of an autonomous regulatory agency for the energy sector is essential for cultivating

[36] Martin, "Oil in Mexico and United States Energy Security: A Tale of Symbiosis," 1.

[37] Thad Dunning, *Crude Democracy: Natural Resource Wealth and Political Regimes* (Cambridge: Cambridge University Press, 2008), 191.

[38] David R. Mares, "Resource Nationalism and Energy Security in Latin America: Implications for Global Oil Supplies," *James A. Baker III Institute for Public Policy, Rice University* (January 2010): 18–19.

[39] Ibid., 18.

[40] Ibid., 19.

independent industry growth and promoting fiscal transparency, as it explicitly moderates rent appropriation and distribution by political actors or technocratic elites. Lastly, leaders within a fully democratic construct are generally more likely to implement more progressive and innovative policies, and are more apt to undertake economically risky endeavors. As such high risk/high reward strategies, if successfully executed, are likely to win the favor of the electorate, while continued stagnant economic growth because of overly risk-averse governmental policy can direct impatient, self-interested voters to the opposition in search of more fruitful results.[41]

Such advantageous institutionalizations were not constructed in Mexico's oil industry under a single party regime. Instead, the existing single party, authoritarian government "saw democracy as a threat to be feared rather than a reward to be won and it sought above all to maintain unity within the elite."[42] Consequently, ensuing political administrations through the 1970s in Mexico, all under the single party regime of the *PRI*, managed Pemex to minimize political risks rather than to maximize profits or process efficiency. Throughout this period, Pemex was managed in a manner only "efficient enough to avoid disaster or major scandal, but operated as a largely closed community with self-imposed, often self-defeating, policies and limitations."[43] Time and again, Mexican leaders incessantly chose to endorse institutional initiatives and reforms, with regard to Pemex, that were politically palatable rather than actually necessary for promoting energy sector growth and modernization.[44]

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[41] Phillips, "The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex," 37.

[42] Ibid., 38.

[43] Ibid., 38–40.

[44] Lourdes Melgar, "Energy Transition: A Path Toward Sustainable Development in Mexico," *Latin American Policy* 1, no. 1 (2010): 100.

D. *LOS SEXENIOS*: 1976–2000 THE SHIFT TO DEMOCRATIZATION

1. José López Portillo (1976–1982)

> En el mundo de la economía los paises se dividen en dos: los que tienen petróleo y los que no lo tienen. ¡Y nosotros lo tenemos!—In the world of economics, countries are divided in two: those that have oil and those that do not. And we have it![45]

A fortuitous combination of geological discoveries and international economic factors during the presidency of José López Portillo allowed Mexico to develop into one of the world's leading petroleum exporters. While Mexico's oil production levels and subsequent revenues skyrocketed as oil prices soared during the "oil boom" of the late 1970s and early 1980s (see Figure 2), oil production more than doubled between 1979 and 1980 alone, Pemex actually saw its financial standing depreciate.[46] This deterioration was mostly due to the exorbitant state taxation of Pemex, which increased exponentially between 1977 and 1981 (see Table 1), and the limited earnings generated from domestic sales of state-discounted petrol, which at the time accounted for half of Pemex's total output. The combination of artificially low domestic prices coupled with high taxation was a tactic utilized by the government, specifically the ruling party, as a means of wielding political control over Pemex. The exertion of political control over Pemex during this period was, more specifically, directed at their Director General, Jorge Diaz Serrano (1976–1981), who had repeatedly vocalized his presidential ambitions for the 1982 election.[47] This financial stranglehold placed upon Pemex by the *PRI* ultimately forced the organization to fund infrastructure investment and oil exploration with international debt. Given Pemex' position as a major, globally recognized corporation, the Mexican government purposely diverted investment capital away from Pemex, via exorbitant corporate taxation, as it was assumed that Pemex could borrow at a better rate than could other state agencies.[48]

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[45] José López Portillo, 1981.

[46] Ibid., 39.

[47] Ibid.

[48] Ibid., 38–40.

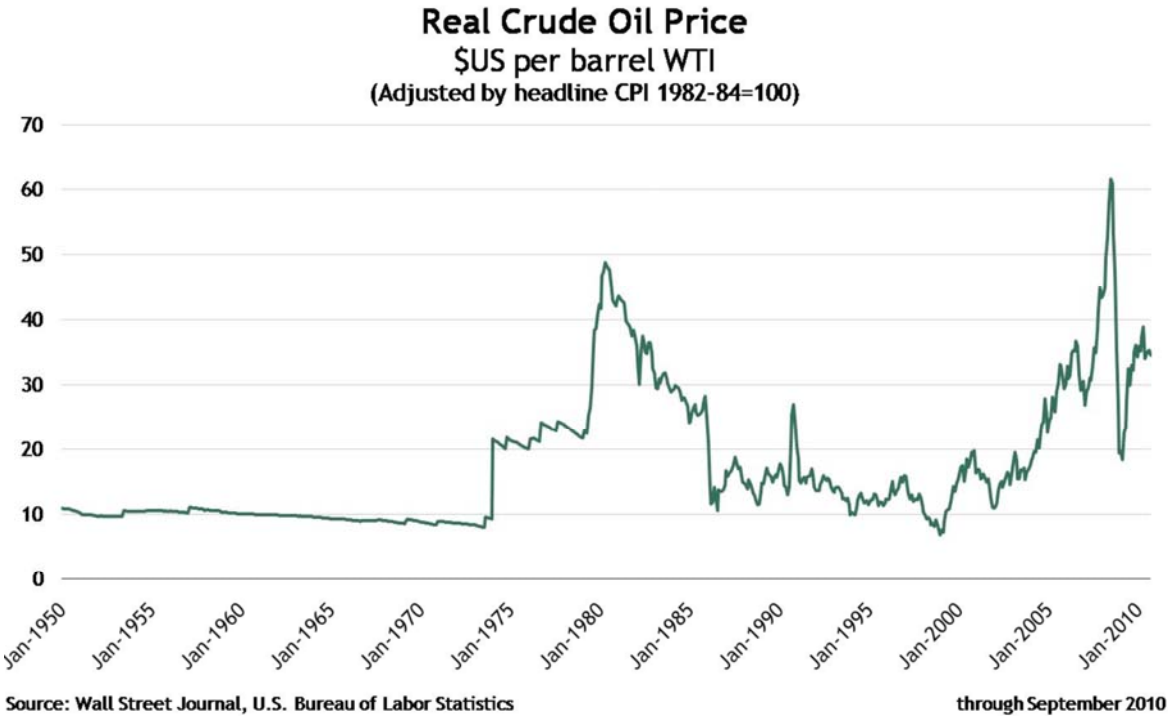

Figure 2. Real Crude Oil Prices 1950–2010 (in U.S. dollars)[49]

	1977	1978	1979	1980	1981
Income	3.64	5.04	8.09	15.58	19.1
of which exports	0.85	1.93	4.42	9.81	14.6
domestic sales	2.20	2.65	3.18	4.11	4.4
Inventory etc.	0.59	0.46	0.49	1.66	0.1
Current costs	1.48	1.94	2.91	4.34	5.4
Investment	1.54	3.06	3.66	5.25	9.3
'Other costs'	0.2	0.29	0.28	0.40	1.2
Other liabilities					
Taxation	0.83	1.19	2.06	7.00	9.9
Debt service	0.81	0.81	2.45	4.36	9.1
Financial surplus /(deficit)	(1.22)	(2.26)	(3.27)	(5.77)	(15.7)

Table 1. Pemex' Profit and Loss (P&L) Statement 1977–1981 (in U.S. dollars m)[50]

[49] Laurel Graefe, "The Policy Implications of Peak Oil."

[50] Gabriel Székely, *La Economía Política del Petróleo en México 1976–1982* (México: El Colegio de México, 1983), 123.

In 1976, Mexico discovered an oil goldmine along an inlet of the Gulf of Mexico known as the Bay of Campeche. The discovery of the supergiant[51] Cantarell oil field, named for the fisherman who accidentally discovered it by laying his fishing nets across oil deposits bubbling to the surface, mustered in the golden age of Mexico's oil industry with the lure of "easy oil."[52] The Cantarell field is located in the shallow waters just off the coast in the Bay of Campeche and is the world's third-largest oil field ever discovered in terms of volume and was the second-largest producer in the world until 2006, producing 2.1 million barrels per day at its peak.[53] Whether this momentous discovery is a blessing or a tragedy has yet to be decided.[54] However, what is clear is that the seemingly inexhaustible production and subsequent bonanza of revenues spared Mexico and its oil giant Pemex from having to address the myriad of inefficiencies and corruption within its operational and managerial ranks. Additionally, because Cantarell's treasure is located in shallow waters and is easily accessible (some areas barely required drilling), Pemex was allowed to carry on with business as usual throughout this period rather than developing best business practices, acquiring updated machinery, or sharpening its technological expertise like other oil companies were forced to do in order to remain competitive. Furthermore, since Cantarell was a naturally highly pressurized oil field, Pemex was able to drill literally hundreds of shallow wells into the ocean floor, stand back and watch as production soared.[55] Ultimately, Pemex was able to employ low-tech, inexpensive techniques and still maximize productivity output. This upsurge in oil productivity in spite of minimal capital investment consequently substantiated and further incentivized increased taxation by the *PRI*, as Pemex' production levels were not negatively affected by their lack of capital funding or innovation. Concomitantly, as oil prices and production levels exploded so did the government's dependency on oil rents. Petroleum constituted a considerable portion of the Mexican economy throughout the

[51] Defined as an oilfield that holds 5 billion or more barrels of recoverable oil.

[52] Martin and Merzeau, "Taking Stock of Oil and Pemex and Implications of the Gulf Spill," 2.

[53] Martin, "Oil in Mexico and United States Energy Security: A Tale of Symbiosis," 3.

[54] Rossana Fuentes Berain, "Petreóleo en México: Pozo de Pasiones. El Debate sobre la Propuesta de Reforma Energética" (paper presented at the Woodrow Wilson International Center for Scholars, Mexico Institute, Washington, D.C., November 14, 2008): 2.

[55] Ibid.

López Portillo administration; oil consistently accounted for about 19% of the nation's GDP, constituted for upwards of 60% of Mexico's total exports and almost 50% of the government's revenue during his presidency.[56] This period of historic growth and prosperity for Mexico, namely as a result of Mexico's massive oil wealth, was perfectly and succinctly captured when President López Portillo exclaimed in a speech, "*¡Vamos a administrar la abundancia!*—"We are going to manage the abundance!" The negative, and lasting, affects of Cantarell's "easy oil" will be examined in further detail in Chapter III of this thesis. Additionally, the ensuing chapter of this thesis addresses Pemex' bloated workforce as compared to its counterparts, namely *Petróleo Brasileiro S.A.* (Petrobras), as an example of its inefficiency and mismanagement.

Lastly, it is also worth noting that corruption within Pemex was especially rampant under the leadership of Director General Jorge Diaz Serrano, who resigned in 1981 once it had become clear that President López Portillo would not entertain his political aspirations. It was customary at the time for the incumbent president to handpick his successor, a highly politicized practice known as *el dedazo*, a decree that was usually bestowed upon the incumbent's favorite cabinet member or political ally, and not necessarily upon the most qualified candidate. Only two years after resigning his post at Pemex, Diaz Serrano was sentenced to 10 years in jail for embezzlement and ordered to pay the Mexican Government US$54 million for losses suffered from unauthorized spot market sales.[57] As a result of this corruption, oil exports were tightly controlled by a newly created secretarial commission under the purview of the *Secretaría de Energía, Minas e Industria Paraestatal* (SEMIP), Secretariat of Energy, Mines, and State-Owned Industry. This agency would later become a substantially politicized obstacle that "proved too bureaucratic to be able to respond swiftly to changing market conditions."[58]

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[56] "Mexico: From Boom to Bust," *The Economist*, February 11, 1989.

[57] Dan Williams, "Ex-Pemex Chief Gets 10 Years for Fraud," *Los Angeles Times*, May 8, 1987, http://articles.latimes.com/1987-05-08/news/mn-2819_1_diaz-serrano.

[58] Phillips, "The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex," 43.

2. Miguel de la Madrid Hurtado (1982–1988)

After the embarrassing revelations of deep-seated corruption within Pemex as a result of Diaz Serrano's highly publicized criminal trial, Mexico's newly elected president Miguel de la Madrid promised a 'moral renovation' of Pemex but soon found it more politically advantageous to embrace an exceedingly cautious approach toward reforming Pemex's internal policies in order to avoid conflict with party leaders and slow Mexico's impending democratization.[59] During his administration, Pemex' financial situation became increasingly fragile, as it was no longer able to rely on debt finance for infrastructure projects and exploration in the face of Latin America's debt crisis of the 1980s, or what is commonly referred to as "the lost decade." For the remainder of his term, the de la Madrid government further slashed Pemex's infrastructure and exploratory investment capital, and instead diverted surplus funds to cope with and repay mounting debt in an attempt to offset the damaging effects of the country's debt crisis.

Moreover, in an attempt to maintain the elevated oil prices of the early 1980s (see Figure 2), the de la Madrid government broke from its long-standing U.S. centric energy policies and encouraged greater collaboration and solidarity with OPEC nations. In accordance with OPEC recommendations and formalized pacts, Mexico purposely reduced its oil production in an effort to raise oil prices. However, Mexico continuously found itself at the losing end of the prisoner's dilemma game;[60] honoring its production limits while other OPEC nations failed to comply, thus dropping the price of oil and exacerbating the biting effects of the ongoing debt crisis.[61]

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[59] Phillips, "The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex," 42.

[60] The Stanford Encyclopedia of Philosophy defines Prisoner's Dilemma as a puzzle that illustrates a conflict between individual and group rationality. A group whose members pursue rational self-interest may all end up worse off than a group whose members act contrary to rational self-interest. More generally, if the payoffs are not assumed to represent self-interest, a group whose members rationally pursue any goals may all meet less success than if they had not rationally pursued their goals individually. In the case of Mexico, Mexico chose to pursue the best interest of the collective group rather than pursue individual self-interest. However, the other members of the group reneged from the group agreement and, instead, pursued their own self-interest. Thus, Mexico was on the losing end, as it neither met its individual or group goals.

[61] Phillips, "The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex," 42.

For the remainder of his presidential term, the de la Madrid government continued imposing a heavy tax burden on Pemex. In fact, at a 1988 director's meeting, Pemex's Director General Francisco Rojas revealed that Pemex's operating budget in 1989 was, in real terms, less that it was in 1973 even though the company was producing approximately 15 times more oil than in 1973. "The Mexican government was willing to sacrifice the growth which might have been achievable had Pemex been allowed to invest more, in return for enjoying some short-term fiscal advantages."[62] Rather than reinvesting oil revenues back into drilling infrastructure or exploration, an advantageous use of public funds, the Mexican government instead carelessly pursued costly public works projects, such as an ill-fated nuclear energy program. Such behavior is consistent with Ross' contention that "few oil-rich countries have the fiscal discipline to invest the windfalls prudently, most squander them on wasteful projects."[63] Arguably, this heavy tax burden and severe budgetary constraints also impacted Pemex' industrial safety capacity, as it experienced a considerable spike in industrial calamities during this period. As a result, Pemex, starved of working capital, was left with little incentive to improve efficiency, as any resulting additional revenue surplus was sure to be taxed away by the state.

3. Carlos Salinas de Gortari (1988–1994)

The Salinas de Gortari *sexenio* was period of rather intense market-oriented reform and liberalization in Mexico. In 1988, the newly elected president, Carlos Salinas de Gortari, was initially more willing than his predecessor to challenge the logic of long-standing energy policy and push for market-oriented reform in the oil sector. He was even able to successfully deregulate the petrochemical sector, allowing for private investment.[64] Mexico privatized a great many national industries previously owned by the state during the presidential term of Salinas de Gortari. In fact, when he took office,

[62] Phillips, "The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex," 44.

[63] Ross, "Blood Barrels: Why Oil Wealth Fuels Conflict," 2.

[64] Phillips, "The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex," 45–46.

Mexico had some 600 state owned industries, and by the end of his *sexenio*, it only had 250. Salinas de Gortari successfully privatized the Mexican banking system, a television station (now TV Azteca), and the telephone monopoly Telmex. It is worth noting, however, that the privatization of most these state owned industries was a highly clientelistic and corrupt process, and could be more accurately described as crony capitalism.

However, despite a considerable push for oil sector privatization by two key Salinas advisors, Pedro Aspe Armella the Finance Minister and José Córdoba Montoya the president's right hand, the Salinas administration soon decided that oil and gas sector deregulation and privatization was too politically contentious an issue.[65] Given that democratization appeared imminent, the Salinas administration could not risk gift-wrapping the presidency for the opposition and decided, instead, that the oil and gas sector would remain emphatically under public purview. While unable to privatize Pemex, Salinas did, however, slash its labor force nearly in half, from 210,000 in 1988 to 107,000 by the end of his term. Additionally, Salinas successfully exercised his unrestrained presidential purview to appreciably weaken the Pemex' labor union, Sindicato de Trabajadores Petroleros de la República Mexicana (STPRM), even ordering the arrest of their union leader on charges of a racketeering and murder.[66] Throughout his presidency, Salinas maintained financial constraints on Pemex by continuing to tax their profits heavily (see Table 2). The Mexican government continued to manage Pemex' associated in a highly risk averse manner. This risk averse strategy and orientation by the government with regard to their oil industry ultimately proved counterproductive, even self-defeating, as political and technocratic elites, who were now presented with real democratic competition at the executive and gubernatorial level, failed to reform the sector and were ultimately unable to provide continued economic benefits to the populace.[67] During this period, however, Mexico was able to pursue effectively other,

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[65] Grayson, George W. "Mexico: New President Pledges Economic Privatization," *Petroleum Economist* 56 (November 1994): 28.

[66] Ibid., 45.

[67] Ibid., 37.

more lucrative economic opportunities with the signing of the North American Free Trade Agreement (NAFTA) in 1994. Mexico successfully exploited their close proximity to U.S. markets as one of their most valuable economic competitive advantages and, as a result, were consequently able to substantially reduce their economic dependency on oil exports and revenues as their principal economic resource. It should be noted, however, that while the state's reliance on oil exports and revenues for economic growth was largely reduced, oil politics became no less contentious of a topic particularly as an election approached.

In 1994, litigious oil politics and the threat of democracy became uniquely genuine when Cuauhtémoc Cárdenas, the son of former president Lázaro Cárdenas, announced his candidacy for the presidency under the newly minted, left-wing political party, *Partido de la Revolución Democrática* (PRD). Cuauhtémoc Cárdenas, not surprisingly given his familial lineage, built much of his political platform around oil nationalism. He was extremely critical of oil deregulation reform initiatives in Mexico, calling for the end of foreign drilling contracts and for further exploration to be carried out exclusively by Pemex. As a result of mounting political pressure exerted on the *PRI*, the Salinas government quickly withdrew from its pursuit of oil sector reforms and liberalization. "This fundamental political reality continues to affect development of the nation's huge oil resource potential by restricting private–particularly foreign–investment."[68] While this political repositioning paid political dividends, at least in the short run, as the PRI was able to maintain control of the executive by winning the 1994 election while Cuauhtémoc Cárdenas placed a disappointing third, it is arguable in this case that the prospect of democratization ultimately retarded key energy sector reforms.

[68] Martin and Merzeau, "Taking Stock of Oil and Pemex and Implications of the Gulf Spill," 2.

	1988	1989	1990	1991	1992	1993	1994
Total Sales	$13.6	$15.8	$19.6	$19.4	$25.1	$28.7	$29.7
Gross Profit	$6.4	$9.0	$11.3	$10.8	$14.6	$15.0	$17.2
Government Taxes	$5.9	$7.7	$9.9	$9.8	$13.5	$14.0	$16.3
Net Income	$0.5	$0.3	$1.4	$1.0	$1.1	$1.0	$1.0
Taxes as a Percentage of Gross Profits	92%	86%	88%	91%	92%	93%	95%

Table 2. Pemex' gross revenues, taxation, and net income, 1988–1994 (in U.S. dollars bn)[69]

4. Ernesto Zedillo Ponce de León (1994–2000)

By all accounts, the 1994 presidential election of *PRI* candidate Ernesto Zedillo Ponce de León was an undisputed free and fair election. This was arguably the first such election that Mexico had experienced in some years and marked a shift to democratic politics at the executive. In December 1994, after only a few days in office, the newly elected president and Ivy League educated economist, converted Mexico's monetary policy from a fixed exchanged rate—pegged to the U.S. dollar - to an open exchange rate. Zedillo allowed the *nuevo peso*, which had been artificially inflated and tightly controlled by the outgoing Salinas administration, float freely in open exchange markets. While economically sound, this shift in monetary policy proved to be politically disastrous for the inexperienced politician and his cabinet, as the peso was devalued by nearly 50% in only a matter of days. Coined "The December Mistake" by the outgoing Carlos Salinas de Gortari, this devaluation had negative economic implications as far reaching as South America, namely the Southern Cone, where it became kiddingly referred to as "The Tequila Effect." U.S. President Bill Clinton attempted to revive the peso with a $50B loan to Mexico to little avail, a courtesy not extended to the Southern Cone states.

Zedillo's term was marred by numerous monetary gaffes and subsequent currency depreciations. These political blunders arguably sparked the unraveling of the once prominent *PRI* party and ushered in rising political opposition, both from within the *PRI*

[69] Source data from Phillips, "The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex," 47.

and outside it, thus allowing rival parties the first legitimate opportunity to challenge for the presidency.[70] During his presidency, Mexico experienced a harsh recession, namely sparked by a debilitating dip in crude oil prices in the late 1990s when prices fell below US$9 (see Figure 2). While a combination of the recession, record low oil prices, and NAFTA had served to further instigate a change in Mexican oil policy and decreased their dependence on oil as a primary export, it should be noted that the Mexican government leaned increasingly on Pemex as a source of tax income during this period, thus contracting Pemex' already anemic operating budget.[71] Unlike his predecessors, Zedillo was no longer afforded the luxury simply avoiding or ignoring politically contentious issues under the pressure of democratization; thus he was neither able to reform Mexico's energy policy nor seriously consider privatization.

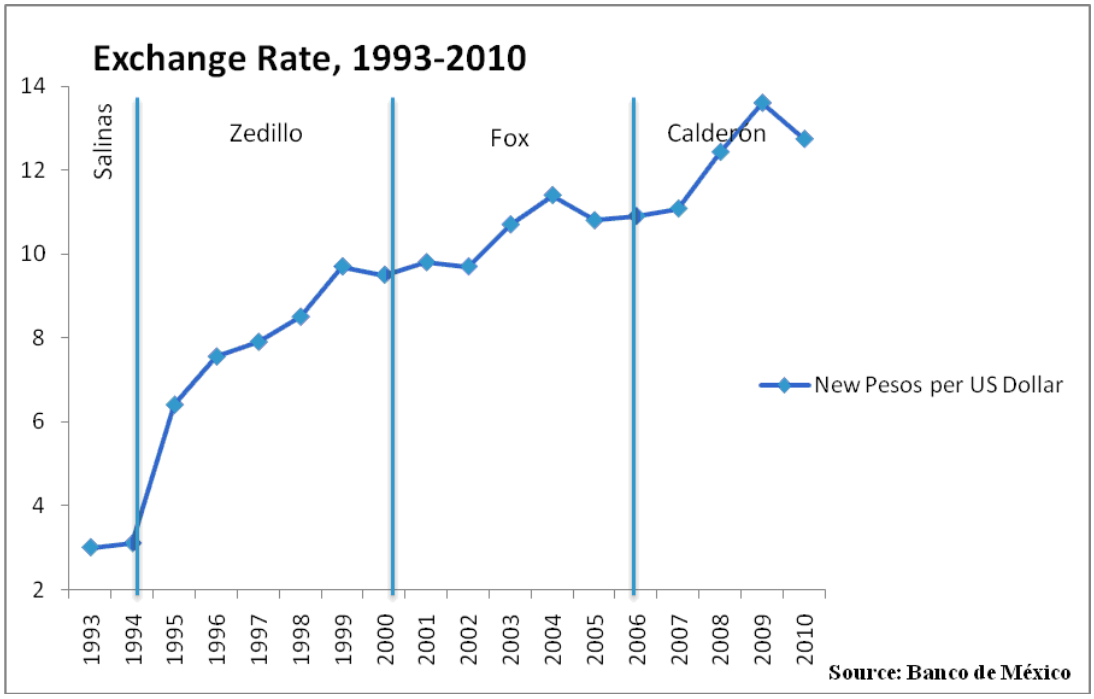

Figure 3. *Nuevo Peso* Exchange Rate Against U.S. Dollar Since Inception.[72]

[70] Judith A. Teichman, "Policy Sector Power and Market Reform: Exploring the Domestic Origins of Argentina's Meltdown and Mexico's Policy Failures," *Third World Quarterly* 23, no. 3 (2002): 501.

[71] Phillips, "The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex," 48.

[72] Source data provided by Banco de México.

E. CONCLUSION

The unprecedented transfer of executive power from the *Partido Revolucionario Institucional* (PRI), which ruled uncontested for nearly 70 years, to the *Partido Acción Nacional* (PAN) in 2000, served as a clear indicator of the democratization of Mexico's political system. However, this democratization has also served as a gradually sobering wake up call for many Mexicans amid the realization that the presidency has, in fact, been severely weakened. Gone are the days when the president, referred to as the *tlatoani*—Aztec for ruler, commanded undisputed dominance and unreservedly exercised his free will over the Mexican political landscape. "The problem is no longer too much power in the hands of the president, but too much power seized by those who want to sabotage and constrain him."[73] Additionally, the widespread perception that the shift to democratic rule brought with it only negligible change left many Mexicans impatient with democracy; as disappointment and disillusionment became part of the daily vernacular used to describe their political sentiments.[74] In fact, since the inaugural Latinobarómetro poll was taken in 1995, Mexico has consistently ranked as the least satisfied with how democracy works in their country. Only approximately 11% of respondents in the 1995 poll answered that they were "very satisfied" or "somewhat satisfied" with democracy in their country. Purely as a reference, according to the most recent Latinobarómetro poll conducted in 2010, Mexicans rank last in Latin America in terms of their satisfaction with democracy in their country.[75] The current paralysis of democracy is analyzed in Chapter III.

In the end, history matters. While the future is not preordained by decisions made in the past nor do these decisions necessarily set states on a path dependent course, past decisions do, however, limit their prospects and forge their environment. This chapter has illustrated and examined how institutional dynamics (authoritarianism and

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[73] Denise Dresser, "Mexico: Dysfunctional Democracy," in *Constructing Democratic Governance in Latin America* (3rd Ed.), ed. Jorge I. Dominguez et al. (Baltimore: The Johns Hopkins University Press, 2008), 243.

[74] Ibid., 247.

[75] "The Latinobarometro Poll. The Democratic Routine," *The Economist*, Americas section, December 2, 2010, 51.

democratization) and structural factors (ease of accessibility to oil fields) have affected and shaped Mexico's petroleum sector. This chapter has provided a historical context from which to proceed. The ensuing chapter provides an in depth analysis of Mexico's oil production crisis as it currently stands, to include a comparative analysis of how Pemex' production levels, process efficiency, and deepwater drilling capabilities and technologies compare to other state-owned petroleum companies in the region, specifically Petróleo Brasileiro S.A. (Petrobras) and Petróleos de Venezuela S.A. (PDVSA).

III. CONTEMPORARY CHALLENGES: OIL WANES AND DEMOCRACY PARALYZES

A. INTRODUCTION

This chapter presents and analyzes Mexico's contemporary challenges vis-à-vis its oil sector. Having established the historical context of the nationalization of Mexico's oil industry, as well as introduced various institutional and structural factors concerning the institutional development of Pemex in Chapter II, this chapter evaluates how those factors have influenced or lead, at least in part, to the current crisis. This chapter further addresses the hypothesis that the Mexican dilemma is not consistent with Hubbert's peak oil theory, and is therefore attributable to other factors that will be explored throughout this chapter. The chapter then focuses on Mexico's recent push for deepwater[76] and ultradeep water[77] drilling technology techniques to be employed along the Gulf of Mexico. It provides a comparative analysis of Pemex' deepwater projects and operational efficiency against those of other transnational corporations and nationally owned companies (NOCs) operating in the region. It addresses growing concerns regarding the security implications of Mexico's current state as related to external economic factors. Lastly, it evaluates how recent energy sector reform initiatives have been brought to a standstill by political maneuvering and democratic paralysis.

B. HUBBERT'S PEAK OIL THEORY AND CONTRASTING COUNTERARGUMENTS

Dr. M. King Hubbert's peak oil theory employs a quantitative method that relies on a mathematical curve, commonly referred to as Hubbert's curve, which is not entirely unlike a bell curve. This theory predicts that oil reserve extraction and production levels will inherently follow along this curve, peaking then rapidly declining, as oil is a finite and depletable material. His theory further contends that once 50% of a region's reserves are produced, that production levels will begin to decline at an accelerated rate. While,

[76] Defined as drilling conducted at water depths up to 500 meters of water.

[77] Defined as drilling conducted at water depths as great as 3,000 meters.

Hubbert's theory was successfully employed in the 1950s and 1960s for predicting oil production in the United States, gaining Hubbert considerable notoriety in his field. This theory has been the source of a highly contentious and ongoing debate since its introduction.

The considerable debate vis-à-vis peak oil persists to the present day, as numerous scholars and oil industry leaders, such as Robin Mills and Leonardo Maugeri, have altogether disregarded peak oil theory. Author Robin Mills discounts this theory as invalid and ineffectual, as, she contends, numerous governments and corporations have employed Hubbert's curve to mostly false predictions. "Hubbert's genius (or luck) is that he is the only person to have made a correct quantitative prediction of oil depletion using this method; to the United Kingdom, the world, or wherever, all else who have applied it have been egregiously wrong."[78] Leonardo Maugeri goes so far as to discount peak theory as mere fantasy and suggests that undiscovered oil reserves are plentiful and will continue to be exploited as new extractive technologies are introduced, as new technology will serve to make currently impracticable and cost-prohibitive wells more easily accessible.[79] He further asserts that global energy demand will peak before global supply does.[80] However, weight should also be given to the counterargument that it is not entirely prudent to rely on the assumption that some future technology will be able to efficiently provide for energy demands.[81] It should additionally be noted, however, that present-day estimates of the world's undiscovered conventional petroleum deposits are ambiguous, at best. The U.S. Geological Survey (USGS) estimates these reserves at between 0.4 trillion and 1.2 trillion barrels.[82]

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[78] Robin M. Mills, *The Myth of the Oil Crisis: Overcoming the Challenges of Depletion, Geopolitics, and Global Warming* (Westport: Praeger Publishers, 2008), 35.

[79] Leonardo Maugeri, *The Age of Oil: The Mythology, History, and Future of the World's Most Controversial Resource* (Westport: Praeger, 2006), 47.

[80] Graefe, "The Policy Implications of Peak Oil," 3.

[81] Ibid., 9.

[82] Ibid., 11.

C. CANTARELL DECLINES, PEMEX SCRAMBLES

Beginning in 2004, Mexico is experiencing a period of sharp production decline, primarily due to the acute drop-off in production of the Cantarell oil field (see Figure 4). While it is worth noting that Cantarell is not Mexico's only substantial oil field, the 850,000 barrels per day currently produced at the Ku Maloob Zaap (KMZ) field, Mexico's largest source of new production, pale in comparison to the 2.1M barrels per day that Cantarell produced at its peak.[83] "Cantarell's development ultimately suffered from an almost perfect storm of mismanagement due to inefficient technology, insufficient capital budgets, and intense pressure to produce as much oil as possible thereby maximizing its rent for the federal government."[84] It is additionally worth noting that Cantarell's drop in production cannot be solely attributed to the inevitable ends of simply having reached its peak, as Hubbert would argue; much can also be accredited to Pemex's antiquated infrastructure, which is a direct result of decades of fiscal strangulation by the Mexican government. Case in point, when Cantarell, a naturally highly pressurized field, began losing internal pressure as a result of an overly perforated surface (literally hundreds of wells), Pemex employed a widely employed industry process known as nitrogen injection to maintain positive pressure within the field and continue pumping at elevated rates. However, an unintended consequence of this process was the intrusion of saltwater into the reservoir. This intrusion of saltwater did, in fact, further decrease the production levels at Cantarell, as Pemex lacked basic water-separation equipment and was unable to obstruct the influx of saltwater.[85] The loss of production due to a categorical lack of basic equipment and infrastructure is yet another consequence of the financial constraints placed on Pemex by the Mexican government. As a noteworthy contrast, the Saudis have recently begun purposely pumping saltwater into the Ghawar oil field, the world's largest producing field, to maximize production; contrastingly what is a hindrance to one is a tool for another.

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[83] Martin and Merzeau, "Taking Stock of Oil and Pemex and Implications of the Gulf Spill," 4.

[84] Martin, "Oil in Mexico and United States Energy Security: A Tale of Symbiosis," 3.

[85] Mills, *The Myth of the Oil Crisis: Overcoming the Challenges of Depletion, Geopolitics, and Global Warming*, 137.

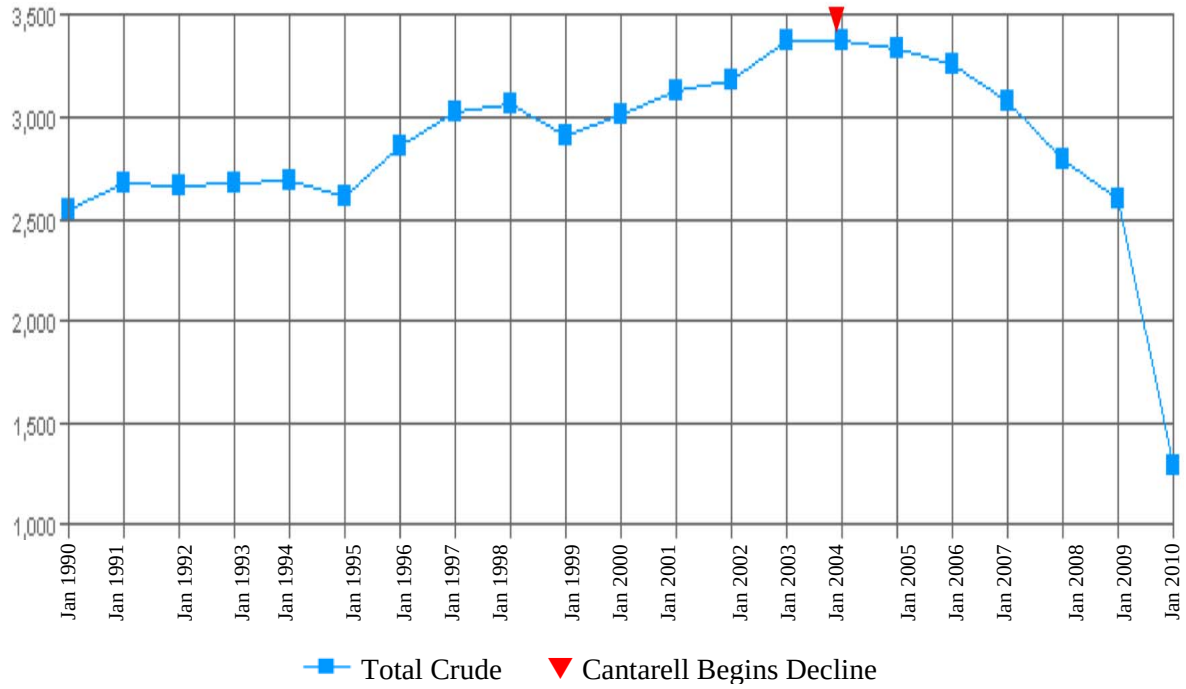

Figure 4. Mexican Crude Oil Production, 1990–2010 (thousand barrels per day)[86]

Significant technological advances and innovations, particularly in the latter part of the 20th century, have provided present-day oil companies the ability to explore and develop oil wells located deep beneath the ocean floor. Modern-day oilrigs are capable of drilling thousands of meters below the ocean floor. These technological advances have been widely employed in the Gulf of Mexico by transnational corporations such as Chevron and Royal Dutch Shell, as well as NOCs like Petrobras and Petróleos de Venezuela for decades. However, Pemex has been largely remiss in the procurement of such technologically advanced capital resources, as high levels of taxation and disadvantageous budgetary constraints imposed on Pemex by the Mexican government has dissuaded, in fact prohibited, the acquisition of such costly material assets. Moreover, the end of "easy oil" in Mexico, largely marked by the depletion of reserves at Cantarell, served to shed a rather glaring light upon Pemex' categorical lack of deepwater, or more specifically ultradeep water, technological expertise and infrastructure. Not until very recently, and this thesis argues as a direct result of the rapid declination of Cantarell, has

[86] Lourdes Melgar, "Impact of the Deep Horizon Oil Spill on Mexico's E&P," 2.

Pemex earnestly pursued the acquisition of deepwater drilling technology and expertise. This behavior is consistent with Leonardo Maugeri's observation that since abundant amounts of conventional oil has been easily accessible for most of the industry's history, there has been little incentive for sizeable investment in innovative technologies and drilling techniques. He further contends that as the "easy oil" is depleted, the pursuit of advanced technologies and techniques will ensue, thus increasing reserve levels as undiscovered and unconventional sources become more readily accessible.[87] Consistent with Maugeri's contentions, Pemex procured a sixth generation deepwater oilrig, *Centenario*, in 2008. This is the first such deepwater oilrig in the Pemex arsenal. Additionally, Pemex has recently awarded contracts for the procurement of four additional platforms, which are scheduled to come online as soon as late 2011. However, observers like Milton Costa, a representative for *Petrobras* in Mexico, contend that it is not simply enough to "purchase technology," but rather it is the management of expertise on those technologies that matters.[88] It should also be noted that these projects have been continuously postponed for a myriad of reasons, namely a weakness at the middle management level within Pemex. Pemex Exploración y Producción (PEP), the internal arm of the company tasked with the acquisition of new equipment and with the development of new oilfields, has very limited experience in evaluating and managing operational risks.[89] This managerial inexperience has become increasingly evident when Pemex contracted transnational oil firm Royal Dutch Shell to drill a perspective oilfield. Pemex leadership, out of their depth managerially, did not provide Shell with the requisite geological survey of the area, as is normal industry practice. Instead, Pemex merely advised Shell to drill in a specified area, and complained when no oil was

[87] Graefe, "The Policy Implications of Peak Oil," 9.

[88] Rossana Fuentes Berain, "Petreóleo en México: Pozo de Pasiones. El Debate sobre la Propuesta de Reforma Energética" (paper presented at the Woodrow Wilson International Center for Scholars, Mexico Institute, Washington, D.C., November 14, 2008) 9.

[89] "Cordero Claims New Oil Contracts Imminent," *Latin American Weekly Report*, WR-10-03 (January 21, 2010): 13.

discovered.[90] This inefficiency has repeatedly cost Pemex valuable time and resources, and is proof that Grayson's argument of "wildcat drilling" continues to hold true at Pemex.

Additionally, and while possibly overly simplistic, it cannot be overstated that deepwater and ultradeep drilling are highly cost prohibitive endeavors, with a steep and lengthy learning curve. It took decades for Chevron, Royal Dutch Shell, and Petrobras – the world's leading deepwater companies – to develop and institutionalize the technical expertise required to drill and produce in deepwater.[91] Pemex is attempting to overcome both of these challenges in a rather short time span, and worse yet, with a weak business culture still intact. To date, Pemex has more than 15-projected deepwater and ultradeep water drilling exploration projects scheduled for commencement (see Figure 5). Some experts and observers have criticized these endeavors of being overly aggressive and lacking in focus, especially given Pemex' lack of technical expertise in deepwater drilling. Dr. Lourdes Melgar, an independent oil consultant and former Director of International Affairs for the Mexican Secretariat of Energy (SENER), censures Pemex' undertakings as "Like trying to go to Mars before first going to the moon."[92]

[90] "Oil Worries Mount," *Latin American Weekly Report*, WR-09-35 (September 3, 2009): 11.

[91] Martin and Merzeau, "Taking Stock of Oil and Pemex and Implications of the Gulf Spill," 6.

[92] "Mexican Oil—Deep Concerns About Deepsea Drilling," *HDNet World Report*, HDNet, Dallas, TX, HDNet (January 6, 2011).

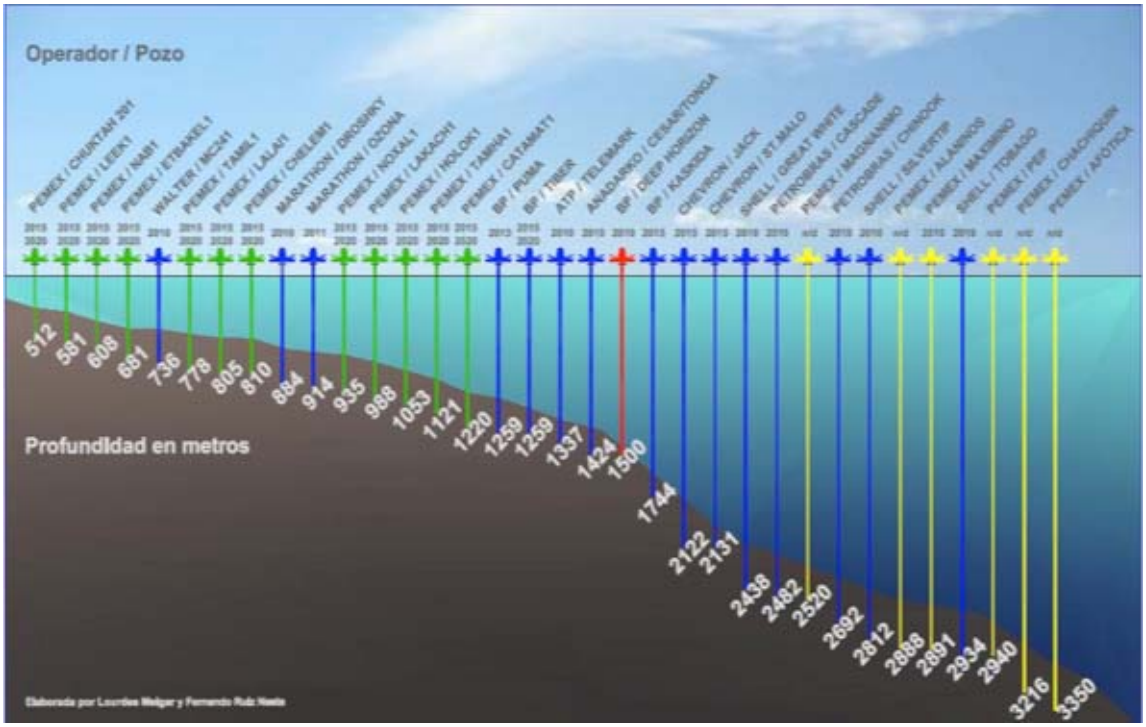

Figure 5. Current and Projected Deepwater and Ultradeep Water Exploration in Gulf of Mexico (in meters)[93]

D. COMPARATIVE ANALYSIS, EXPOSING INEFFICIENCY

To provide a brief contrast and a more clearly articulated illustration of Pemex' operational and managerial inefficiency, this thesis will examine Pemex' 2009 annual report and statistics against those of Brazil's nationally owned oil company (NOC) *Petrobras*. By solely examining their respective number of total employees (see Table 3), it is clearly evident that *Petrobras* operates at much greater efficiency than does *Pemex*. While both firms produce largely equal amounts of barrels per day and total revenues, *Petrobras* is able to achieve these numbers with nearly half the workforce. Additionally, despite the vast potential for lucrative resources in the Gulf of Mexico, Pemex has no deepwater and ultradeep water production; while *Petrobras* has distinguished itself as a world leader in deepwater drilling and production, now accounting for almost 22% of global deepwater production today.[94] At the risk of speculating, this stark contrast raises

[93] Lourdes Melgar, "Impact of the Deep Horizon Oil Spill on Mexico's E&P," 11.

[94] Martin and Merzeau, "Taking Stock of Oil and Pemex and Implications of the Gulf Spill," 3.

the question as to whether this disparity in institutional knowledge is due to the fact the *Petrobras* was not "blessed" with a Cantarell, and therefore had no choice but to hone their deepwater proficiency and innovation in order to remain competitive.

2009 Financial Statement, Pemex and Petrobras

	Total Revenue	Net Income	Total Assets	Barrels per Day (bpd)	Total Employees
Pemex	$80.7	($7.01)	$102	2.5M	141,466
Petrobras	$91.8	$15.5	$200	2.3M	76,919
Net Delta	$11.1	$22.51	$98.0	0.2M	64,547
Favors	**Petrobras**	**Petrobras**	**Petrobras**	**Pemex**	**Petrobras**

Table 3. 2009 Financial Statement, Pemex and Petrobras (in U.S. dollar bn)[95]

E. NEW REFINERY, OLD POLITICS

In an attempt to generate much needed future revenue flow from gasoline sales, Pemex announced in April 2009 that it would begin building Mexico's first new oil refinery in 30 years in Tula, Hidalgo.[96] The location of the new project has been highly criticized as being more of a political maneuver in nature by the ruling PAN party, or pork barrel spending, than a sound business decision promising greater returns. President Calderón has responded to such criticism by insisting that the Tula location was chosen because of its primary competitive advantage, its close proximity to Mexico City (the country's center of consumption for refined petrol), and therefore, presented the lowest transport cost and required less pipeline infrastructure than other competing locations. In addition to accusations of "pork barrel" spending and political favoritism, this project has also been criticized by the private sector for investing public funds into refining facilities rather than into exploration, as it is the general consensus that "the best use of cash flow is to use it to explore for more oil."[97] While Pemex's internal figures forecast a rate of return of 17.5% annually for the Tula refinery, a considerable amount, it is dwarfed when

[95] Source data from 2009 Pemex and Petrobras Financial Statements and Martin and Merzeau, "Taking Stock of Oil and Pemex and Implications of the Gulf Spill," 3.

[96] Andres R. Martinez, "Pemex Picks Hidalgo Site for $10 Billion Oil Refinery," *Bloomberg BusinessWeek*, April 14, 2009.

[97] "Pemex Chooses Hidalgo for Refinery," *Latin American Weekly Report*, WR-09-15 (April 16, 2009): 11.

compared to the 100% plus returns earned from striking new oilfields.[98] President Calderón has resolutely defended the Tula refinery project, asserting that building this refinery will invite the private sector to build refineries. This of course, is contingent upon if his administration can get their energy reform proposals approved through the congress, thereby allowing for private investment in Mexico's oil sector; these recent attempts to reform Mexico's energy sector are examined in greater detail later in this chapter.

It is worth noting that the Tula refinery is projected to cost in excess of US$9.2B and is, by far, the largest infrastructure project to be undertaken by the Calderón administration to date.[99] This project was an especially risky endeavor for the Calderón administration, and stirs up echoes of Vicente Fox's ill-fated 2001 proposition to build a new Mexico City airport in Texcoco (located in the State of Mexico). Like the Texcoco venture, the Tula refinery required 700 hectares of agricultural land and the subsequent eviction of thousands of *ejidatarios* (peasant workers) off the land. In August 2009, the state of Hidalgo was able to secure the land and the refinery is scheduled to be operational sometime in 2015.[100] Regrettably, the project was brought to a standstill when a pipeline running from the port of Dos Bocas, Tabasco to a preexisting Tula refinery exploded and killed 28 in December 2010. The explosion was blamed on a "criminal gang" who was attempting to siphon off fuel from the pipeline.[101] Pemex estimates that it loses in excess of US$700M annually to oil theft;[102] however, a recent police raid of Pemex' headquarters and ensuing governmental audit placed that number at more than US$2B a year in theft.[103]

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98 "Pemex Chooses Hidalgo for Refinery," *Latin American Weekly Report*, WR-09-15 (April 16, 2009): 11.

99 Ibid., 11–12.

100 "Pemex To Build New Refinery in Tula," *Downstream Today*, *Latin America & Caribbean Refining News*, April 15, 2009.

101 "Pemex Pipeline Blast Blamed on Criminals Kills 28," *BusinessWeek*, December 20, 2010.

102 Sylvia Longmire, "PEMEX: Mexico Loses $700 Million Annually to Oil Theft," *Mexidata*, Monday, August 31, 2009.

103 Robert Campbell, "Mexico Police Raid Pemex in Fuel Theft Probe," *Reuters*, July 30, 2009, http://in.reuters.com/article/2009/07/29/mexico-oil-idINN2930145020090729.

F. EXTERNAL ECONOMIC FACTORS AND SECURITY IMPLICATIONS

While waning oil production and energy sector reform are certainly toward the forefront of the Mexican government's agenda, arguably the most pressing issues for Mexico today are drugs and violence. While the recent recession north of the border, coupled with diminishing oil revenues, propelled Mexico's economy into a deep recession in 2009, the situation was further exacerbated by the drug-related violence and explicit activity.[104] This violence, which has included murders, kidnappings, and political intimidation namely along Mexico's northern territory, has become an almost all-consuming battle for the Calderón administration. Mexico's inability to counter the sectarian violence of warring drug cartels effectively, along with its subsequent floundering economy, have brought this once docile neighboring nation to the forefront of U.S. security concerns. In fact, the Central Intelligence Agency (CIA) recently rated Mexico as an equal threat to U.S. national security as Iran, and more of a potential problem than Iraq. Shortly after the publication of this article, the U.S. National Intelligence Director clarified that no plans had yet been drawn up for the deployment of ground troops into Mexico, and emphasized that U.S. strategy was to simply to bolster Mexican forces. The Mexican Interior Minister quickly rebutted such reports, contending that the United States was "panicking" over Mexico's present situation.[105] ADM Mike Mullen, Chairman of the Joint Chiefs of Staff, has been one of the few vocal individuals within the Obama administration to echo such concerns regarding Mexico as a national security threat and has recently advised the President in ways the U.S. military can assist Mexico in combating the drug violence that plague many of its cities.[106] Only recently has President Calderón publically conceded that his strategy "may need to be reworked."[107] These facts are included in this thesis to illustrate the myriad of difficulties currently facing the Mexican state.

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[104] "Brining NAFTA Back Home," *The Economist,* Americas section, October 30, 2010, 37.

[105] Ibid.

[106] "U.S. Grows Increasingly Worried," *Latin American Weekly Report*, WR-09-04 (January 29, 2009): 10.

[107] "What is Going On in Monterrey?" *Latin American Weekly Report*, WR-10-33 (August 13, 2010): 12.

In an attempt to curb the negative effects of waning oil fiscal revenues, the Mexican government has recently, and rather hastily, implemented several austerity programs in an attempt to reduce public spending. However, the Organization for Economic Cooperation and Development (OECD), which is headed by the former Mexican Finance Minister Angel Gurria, strongly advised Mexican policymakers against constricting fiscal policy. The OECD contends that hastily promoting such fiscal austerity will likely intensify the effects of the recession and aggravate public sentiment.[108] One of the many fiscal problems facing President Calderón is a fiscal spending law, *Ley Federal de Presupuesto y Responsibilidad Hacendaria*, put in place by his predecessor Vicente Fox. This law prohibits the Mexican government from running a fiscal deficit. While this new policy was not an issue when Mr. Fox signed it into law in 2006, as oil prices and state revenues soared by 90% in real terms from 2000 to 2008, it has proven to be shortsighted in the face of recent revenue shortfalls.[109] As a result, the Mexican state is confronted with the dilemma of whether to cut public programs or increase taxes. While top officials within the administration call for higher taxes, like Agustin Carstens, Mexico's former finance minister and now Chairman of the Banco de Mexico, levying new taxes may prove politically unrealistic seeing as how no Mexican government has held a congressional majority since the PRI in 1997.[110] It should be noted that while the PAN boasts itself as a fiscally responsible, right of center party, public spending has almost doubled since the last year of a non-PAN administration, increasing from M$1.4T in 2000 to M$2.24T in 2008 (presented in 2009 pesos). Additionally, while the Mexican economy no longer relies exclusively on oil revenues, oil currently represents approximately 4% of GDP, it does, however, rely on oil for public fiscal expenditures. The loss of oil revenues, coupled with external economic factors have served to reveal the stark realization that an effective, non-partisan and autonomous tax collection agency is required, such a state apparatus is blatantly deficient in Mexico to date.

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[108] "Mexico. Floundering," *Latin American Weekly Report*, WR-09-30 (July 30, 2009): 11.

[109] Ibid., 11.

[110] "Carsten Pushes for Higher Taxes," *Latin American Weekly Report*, WR-08-13 (August 13, 2009): 11.

G. OIL REFORMS?

On paper, the Mexican Secretariat of Energy (SENER) regulates Pemex, however in reality and historically, this has never been the case.[111] As the Secretary of Energy in Vicente Fox's cabinet, Felipe Calderón was all too aware of this reality and of the impending energy sector dilemmas facing Mexico when he assumed the presidency in 2006. Since taking office, he has made Pemex' task exceedingly clear, "create economic value for the benefit of the Nation."[112] Accordingly, in 2008, the Calderón administration introduced a proposed energy reform bill before the Mexican Congress. Given the politically contentious nature of oil reform in Mexico, as discussed in previous chapters, this move was, indeed, a bold one. Calderón's proposal made it abundantly clear that his initiative would include no change to the constitution, no privatization of Pemex, and would not seek to diminish the STPRM as other administrations had. However, "the initiative took into account what was politically feasible and not what was actually necessary to tackle the crisis looming in Pemex."[113] In November 2008, after months of political deliberation that included numerous filibusters, Mexico's energy sector bill was issued, but the resulting reform had been heavily "watered down" by the Congress. Newly introduced policy reform allowing for partnership with foreign firms for the exploration and development of new oilfields has been tepid at best.[114] While debates and discussions continue in Mexico vis-à-vis its oil sector, the hope of any meaningful energy reform has been largely paralyzed by democratic stalemate. The *PRI*, which controls 237 of the 500 seats in the lower house, has adamantly and vocally opposed any further reforms of Pemex, likely diminishing the possibility for any acute energy reform in the near future. The *PRI*'s selection of Francisco Rojas Gutierrez, former Director General of Pemex, as its leader in the lower chamber of congress is a clear indication of the party's intention to make oil reform a top political priority. Furthermore, his selection

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[111] Rossana Fuentes Berain, "Petreóleo en México: Pozo de Pasiones. El Debate sobre la Propuesta de Reforma Energética," 19.

[112] Ibid., 14.

[113] Lourdes Melgar, "Energy Transition: A Path Toward Sustainable Development in Mexico," *Latin American Policy* 1, no. 1 (2010): 100.

[114] "Production Problems," *Latin American Regional Report—Mexico and NAFTA*, RM-09-02 (February 2009): 8.

makes it even less probable that Mr. Calderón will see any additional or consequential energy reforms passed before his term expires in 2012. All the while, Pemex's oil production continues to plummet, decreasing by 215,000 barrels per day from 2008 to 2009 alone. For the first time since the discovery of the Cantarell oilfield, Mexico is showing a hydrocarbons exchange balance of less than one million barrels a day.[115] More pointedly, this decrease in output translates into $5.1B in lost annual revenues.[116] It should be noted, however, that while the approved energy reforms are arguably insufficient, they are still in their infancy. Therefore, it may be too early to evaluate their impact fully. Lastly, this political debate has thus far been regrettably remiss in addressing two serious and necessary dialogues; fiscal and tax reform. To date, the Mexican government relies on oil revenues to provide for 35-40% of their fiscal budget. While tax reform is unquestionably a hugely unpopular political topic, some would argue that it is politically suicidal; the fact stands that expanding Mexico's tax base would allow it to generate alternative fiscal revenues and partially alleviate their fiscal dependency on oil. However politically disagreeable, Mexico cannot promote sustained economic growth and development without reforming its negligent tax and fiscal policy.

H. CONCLUSION

Chapter III of this thesis has presented an overview of the numerous contemporary challenges facing Mexico's oil industry. It addressed the relational comparison between Pemex and the Brazilian, state-owned oil firm *Petrobras* in order to provide a comparative evaluation of their respective ability to operate at varying levels of production and efficiency. It argued that since large pockets of oil reserves located in shallow waters, which have thus been referred to as "easy oil," were not available to *Petrobras*, they were required to drill to further depths in search of lucrative reserves; thus developing their deepwater operating proficiency and continuously modernizing their infrastructure. In short, Petrobras was not endowed with a Cantarell, and therefore,

[115] Lourdes Melgar, "Energy Transition: A Path Toward Sustainable Development in Mexico," *Latin American Policy* 1, no. 1 (2010): 99.

[116] "Oil Worries Mount," *Latin American Weekly Report*, WR-09-35 (September 3, 2009): 11.

was forced to improve its operational efficiency and organizational technical knowledgebase in order to remain competitive in a global market. Additionally, this chapter asserted that unlike Pemex, Petrobras' foreign partnerships and corporate alliances were not overwhelmingly constrained by constitutional mandates; this increased structural flexibility allowed Petrobras to develop and institutionalize best industry practices at as an accelerated rate. "The legacy of nationalism in Mexico vis-à-vis oil has perhaps most importantly denied Pemex partnership opportunities with international firms, which would have greatly benefitted it by access to technology, know-how, and fiscal and management efficiencies."[117] In stark contrast to one another, Petrobras is today a global industry leader in terms of offshore deepwater drilling, able to drill at depths in excess of 3,000m; while Pemex has only recently surpassed the 1,000m mark. This statistic stands as perhaps the most revealing disparity with regard to the deepwater technological capability between these two firms.

Additionally, this chapter addressed the energy reforms recently passed by the Mexican government. It contended that these reforms were largely inadequate to deal with the mounting problems facing the Mexican oil industry. Furthermore, democratic debate and political maneuvering within the Mexican Congress have resulted in a political impasse. Again demonstrating that oil and oil reform is a highly contentious political hot button in Mexico, able to stir up nationalistic passions.

[117] Martin and Merzeau, "Taking Stock of Oil and Pemex and Implications of the Gulf Spill," 4.

IV. CONCLUSIONS

Recent efforts by the Calderón government to enact energy sector reform have again proven that, in Mexico, oil continues to be a politically incendiary and socially divisive topic. The resulting initiatives, after considerable internal negotiations within the federal government, have been largely criticized as tepid, at best, and for having only accounted for what was politically achievable and not what was actually needed to address and combat the crisis.[118] Additionally, the most contentious facets of these reforms have been challenged in court as unconstitutional.[119] At the time of writing this thesis, the courts had yet to render a ruling concerning their constitutionality. It should be noted, however, that while these initiatives have yet to result in significant energy sector reform necessary for addressing the crisis at hand, they do, in fact, mark the first time that the Mexican executive, congress, private sector, and civil society have all participated in a comprehensive (and inclusive) dialogue regarding the state of their oil sector. This thesis has analyzed the political shift in Mexico from authoritarianism to democracy in order to emphasize vast influence this shift in political landscape has had on this contemporary oil crisis. "The problem is no longer too much power in the hands of the president, but too much power seized by those who want to sabotage and constrain him."[120] Mexico is now faced with the stark reality that institutional change, particularly within a democracy, is a slow and lengthy process. Dr. Lourdes Melgar, former Director General of International Affairs for the Mexican Secretariat of Energy (SENER), pointedly adds:

[118] Melgar, "Energy Transition: A Path Toward Sustainable Development in Mexico," 100.

[119] Martin and Merzeau, "Taking Stock of Oil and Pemex and Implications of the Gulf Spill," 4.

[120] Denise Dresser, "Mexico: Dysfunctional Democracy," in *Constructing Democratic Governance in Latin America* (3rd Ed.), ed. Jorge I. Dominguez et al. (Baltimore: The Johns Hopkins University Press, 2008), 243.

> It is impossible for a new legal structure to rapidly reverse years of abandonment of the oil industry. Today, Pemex is struggling as a result of years of financial exploitation, appalling underinvestment, poor decision-making, and a governmental policy of short-term benefits to the detriment of the health and viability of the oil company, which has been run not as an enterprise but as an infinite source of revenue for the government.[121]

In addition, the 1976 discovery of the supergiant Cantarell oil field in the Bay of Campeche set Mexico's oil industry on a path dependent course and served to further solidify the operational inefficiencies, political mismanagement, and lack of institutionalized technological prowess within its state-owned oil giant, Pemex. Despite these considerable shortcomings, Pemex was able to produce massive quantities of oil continually, and the Mexican state came to rely heavily on the associated revenues generated. In this case, Mexico clearly fell prey to the so-called "resource curse," as Cantarell's easily accessible reserves and subsequent windfall of revenues retarded Mexico's institutional and structural development, as well as Pemex's managerial maturity and need for technological advancement. Cantarell's overall significance and harmful structural influence leading to Mexico's current oil crisis cannot be overstated or overlooked. Its copious, easily accessible, and seemingly infinite oil reserves allowed, in fact incentivized, myopic behavior and policy to permeate throughout Mexico's oil industry; and paradoxically, setting forth the lasting effects of the easy oil hangover to which Mexico is currently awakening. For the first time since 1981, the initial year of Cantarell production, Mexico is registering hydrocarbon balances of less than one million barrels per day and is forecasted to become a net importer of oil by 2020 unless new reserves are tapped and exploited.[122] Cantarell, the once abundant supergiant and source of Mexican oil industry prestige, appears to be in its final stages of existence, as does Mexico's petro golden age.

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[121] Melgar, "Energy Transition: A Path Toward Sustainable Development in Mexico," 101.

[122] Adrián Lajous, "Mexican Oil and Gas Policies" (presented at the University of Chicago's International and Area Studies Multimedia Outreach Source (CHIASMOS), Chicago, Illinois, March 4, 2009).

Additionally, since Pemex, which has become "a byword for inefficiency and corruption," categorically lacks the technological expertise required to tap newly discovered deepwater reserves located along the Mexican portion of the Gulf of Mexico, the Mexican government may have little choice but to loosen its long-standing protectionist policies and allow for private sector investment into its state owned oil industry.[123] In all, the Mexican state has appropriated a total of $12.2B through 2015 for the procurement of new technologies and equipment, building new refineries and expanding existing facilities. The bulk of this appropriation is to be financed by Pemex.

Today, an impressive, large bronze statue of Lázaro Cárdenas stands ever vigilant at the base of Pemex' massive 50-story corporate headquarters in Mexico City. A formidable and constant reminder that, in Mexico, oil remains an emblem of national sovereignty.

[123] "Cordero Claims New Oil Contracts Imminent," *Latin American Weekly Report*, WR-10-03 (January 21, 2010): 13.

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